

Having thus, described the invention, what is claimed is:

1. A transmission apparatus comprising:

a first rotatable member comprising a first rotatable shaft and at least one first rotatable element operatively attached to the first rotatable shaft;

a second rotatable member comprising a second rotatable shaft arranged in parallel with said first rotatable shaft, said second rotatable member further comprising a plurality of second rotatable elements operatively attached to said second rotatable shaft, said rotatable elements being greater in number than the number of rotatable elements of said first rotatable member;

an endless linking loop interconnecting said first rotatable member and said second rotatable member to transmit rotation therebetween; and

a gear shift mechanism for positioning said endless transmission linking loop among said predetermined number of said second rotatable elements for a transmission operation;

wherein said endless linking loop is applied over said first rotatable member and said second rotatable member in parallel with a plane crossing a center line of said first rotatable shaft at a right angle.

2. A transmission apparatus according to Claim 1, wherein said first rotatable member further comprises a slide mechanism arranged between said first rotatable shaft and said first rotatable member enabling said first rotatable member to be moved axially relative to its rotating center line, and said wherein first rotatable member is connected to said first rotatable shaft through said slide mechanism.
3. The transmission apparatus of claim 2, wherein said slide mechanism comprises a ball spline mechanism.
4. The transmission apparatus of claim 2, wherein said slide mechanism comprises an inner sleeve, an outer sleeve coaxially surrounding said inner sleeve, and a plurality of ball bearings disposed between said inner and outer sleeves.
5. The transmission apparatus of claim 1, further comprising a hollow case housing said first and second rotatable elements and said linking loop.
6. A bicycle comprising the transmission apparatus of claim 1.

7. The transmission apparatus of claim 1, wherein said linking loop is a chain, wherein said first rotatable element comprises a sprocket, and further comprising a chain guard adjacent said sprocket of said first rotatable element.

8. A transmission apparatus comprising:

a first rotatable member comprising a first rotatable shaft and at least one first rotatable element driveably connected to the first rotatable shaft;

a second rotatable member comprising a second rotatable shaft arranged in parallel with said first rotatable shaft, said second rotatable member further comprising a plurality of second rotatable elements greater in number than that of said first rotatable member;

an endless linking loop interconnecting said first rotatable member and said second rotatable member to transmit rotation therebetween;

a gear shift mechanism for positioning said endless transmission linking loop among said predetermined number of said second rotatable elements for a transmission operation;
and

a slide mechanism arranged between said first rotatable shaft and said first rotatable member enabling said first rotatable member to be moved axially relative to its rotating center

line, and said wherein first rotatable member is connected to said first rotatable shaft through said slide mechanism.

9. The transmission apparatus of claim 8, wherein said slide mechanism comprises a ball spline mechanism.

10. The transmission apparatus of claim 8, wherein said slide mechanism comprises an inner sleeve, an outer sleeve coaxially surrounding said inner sleeve, and a plurality of ball bearings disposed between said inner and outer sleeves.

11. The transmission apparatus of claim 8, further comprising a hollow case housing said first and second rotatable elements and said linking loop.

12. A bicycle comprising the transmission apparatus of claim 8.

13. The transmission apparatus of claim 8, wherein said linking loop is a chain, wherein said first rotatable element comprises a sprocket, and further comprising a chain guard

adjacent said sprocket of said first rotatable element.

14. A transmission apparatus for a bicycle provided with a derailleur comprising:

a derailleur shaft supported at a supporting member arranged at a body frame, and
formed with a guide part;

a derailleur arm movably supported at said derailleur shaft;

a rotatable guide member rotatably supported at said derailleur arm and having an
endless transmission linking loop wound around among a plurality of rotatable elements
constituting a transmission rotatable member; and

an operating element for rotating said derailleur arm in respect to said derailleur shaft
by moving while being guided by said guide part in response to a transmitting operation and
at the same time translating said derailleur arm toward a central axis line of said derailleur
shaft characterized in that:

said derailleur shaft is supported in such a way that said central axis line becomes in
parallel with a rotary center line of the rotatable guide member and a rotary center line of the
transmission rotatable member.

15. A transmission apparatus for a bicycle according to Claim 14, wherein said derailleur shaft is rotatably supported at said supporting member; said derailleur has a balancing spring to cause a balancing torque balanced with a torque acted from said derailleur arm to said derailleur shaft to be acted against said derailleur shaft; and said balancing torque is based on a spring force generated at said balancing spring through rotation of said derailleur shaft accompanied by a rotation of said derailleur arm.